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EMOTIONAL STATE-DEPENDENT RETRIEVAL

by

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Dissertation submitted in partial fulfillment of
the requirements for the degree of Doctor
of Philosophy in the Department of
Psychology in the Graduate School
of Duke University

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ABSTRACT

(Psychology-Clinical)

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Emotional state-dependent retrieval (SDR) was examined by means of an interference task. The experimental conditions, including happy, sad or neutral mood states, differentiated a hypothetical effect of interference (similarities in mood at learning of two word lists) from a hypothetical SDR effect (similarities in mood between learning and recall of a word list). The word lists were composed of stimulus words with high or low frequency first associates and the free associates to those stimulus words. Results suggested presence of an asymmetrical SDR effect for sad mood states, but no interference effect nor SDR effect for happy mood states. These findings were discussed in terms of previous research using this mood induction (Velten, 1968). It appears that the mood induction produces a distinctive emotional context for sad moods, but that the happy mood is not significantly different from normal moods. Consequently, recall across sad moods induced by the Velten procedure is state-dependent, and recall across happy moods is not.

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INTRODUCTION

The processing of memories during certain affective states is a topic of interest to clinical and cognitive psychologists alike. Affects are contextual conditions which may serve to differentiate a particular event from nonaffective events or alternate affective events. It follows that such a distinctive property might influence the encoding and retrieval of memories. Were it to be demonstrated that memories are, in fact, processed differently during certain affective states in comparison to nonaffective or other affective states, then the implications for clinical work would be far-reaching.

Many dramatic clinical phenomena, such as hysterical fugue states, multiple personalities, dream amnesia, and childhood amnesia, have been understood in terms of the impact of affects on dissociated memory systems (Hilgard, 1977). Even transient affective states appear to influence the recall of memory (Rapaport, 1942). In the realm of therapy, a successful "cure" is, in some systems, said to be made possible by the reinstitution of dissociated ego states and the retrieval of relevant memories (Freud, 1914). However, the conditions which permit recall of information within and across affective states need to be clarified in order to understand these clinical phenomena further.

Broadly speaking, potential changes in memory processing due to affective states may be separated into three categories. The first category consists of differences due to the encoding conditions. Affective states might alter original learning in either qualitative or quantitative ways. Studies of the effects of anxiety on learning point to the existence of such phenomena (Eysenck, 1976). The second category consists of differences due to the retrieval conditions. Subjects in a particular affective state might alter their retrieval strategies and reconstructive efforts causing either qualitative or quantitative changes in the information retrieved. The last category of possible differences consists of the congruence or lack of congruence between the conditions at encoding and retrieval. Since affective states constitute potentially distinctive contextual cues, the presence of these cues at both encoding and retrieval should facilitate successful recall, and the absence of these cues in one or the other condition should impair recall. This final possibility has been termed "state dependent retrieval" (SDR).

State-Dependent Retrieval

The SDR phenomenon represents an instance of a general principle of memory processing offered by Tulving: "What is stored determines what retrieval cues are effective in providing access to what is stored" (Tulving & Thomson, 1973, p. 353). In other words, recall is successful only when there is an appropriate matching of contextual conditions at encoding and retrieval. The greater the disparity between these conditions, the less

likely information will be retrieved between the two states. The material has been learned, and given the appropriate retrieval cue it may be recalled; until that retrieval cue is found, the material is available, but not accessible. When the cue is reinstated, the memory may be accessed. As long as the contextual conditions at encoding are not reinstated at attempted retrieval, one may say that the memory is "dissociated." However, the problem remains of determining what signifies sufficient similarity between the two conditions to access the memory. In particular, are individual affective states sufficiently distinctive as events to make memories inaccessible without the reinstitution of virtually identical affective states? And what are the formal boundaries of these so-called "states" that make them similar to or different from other "states"? By determining a "generalization decrement" between various mood states, it begins to be possible to define and delineate the nature of these affects (Bower, 1981).

A recent review of human SDR research (Eich, 1980) suggests some properties of the phenomenon. The typical SDR study employs a 2 x 2 matrix of conditions. There are two states at acquisition of the material and two states at attempted retrieval. Since SDR research usually involves psychoactive drugs, the two states are either drugged (D) or drug-free (N)--given a placebo. This 2 x 2 matrix defines four experimental conditions: (a) study drug, test drug (DD); (b) study drug, test drug-free (DN); (c) study drug-free, test drug (ND); and (d) study drug-free, test drug-

free (NN). Conditions DD and NN are congruent state conditions; DN and ND are disparate state conditions. The SDR paradigm predicts better recall in the congruent state conditions than in disparate state ones. In other words, the SDR effect appears as an interaction effect in the 2 x 2 ANOVA. However, as Overton (1974) notes, drugs (as well as other experimental manipulations) produce effects other than SDR ones. These alternative consequences of the drug administration complicate the interpretation of the SDR interaction effect. The presence of a drug at acquisition might have an immediate or delayed effect on learning, the presence of a drug at attempted retrieval might have an effect on retrieval, and these three effects might go in opposite directions. This problem is especially difficult when considering asymmetrical SDR. Asymmetrical SDR refers to the transfer of learning from a drug-free state to a drugged state, but not from the drugged state to the drug-free state. Unfortunately this pattern of results may be obtained by a combination of these other main effects. In other words, symmetrical and asymmetrical SDR may not be distinguished in a 2 x 2 design (Swanson & Kinsbourne, 1978).

Eich (1980) reached several conclusions about the nature of the SDR effect. It seems to depend on the administration of a centrally acting drug such as alcohol, marijuana, and amphetamine. However, each of these drugs have substantial effects on the peripheral nervous system as well. Upon reviewing the entire SDR literature, Eich determined that the type of retrieval test is an important factor in SDR research. SDR effects appear

only in free recall studies, not in recognition or cued recall ones. Eich concluded:

> 1) the occurrence of SDR is limited to experimental situations. . . . in which "invisible" cues may be assumed to guide retrieval, and 2) the deleterious effect of a state change on performance . . . can be completely negated by probing memory with "observable" list or copy cues. (p. 166)

In other words, the presence of an observable cue at retrieval provides a sufficient reminder to access the original memory no matter what state the subject may be in. But without an external reminder, the subject must generate invisible retrieval cues or employ reconstructive strategies which depend on the reinduction of a congruent state. Weingartner and Murphy (1977) agreed:

> Subjects attempting recall from memory in some disparate state cannot self-generate appropriate retrieval strategies with which to effectively access memory although they are able to use such a search plan if it is provided. (p. 66)

Eich (1980) also suggested that the reinduction of a congruent state provides serial order information for the subject that is required to perform a free recall task successfully. He predicted that disparate state retrieval should exhibit less serial order as well as less absolute recall.

Bower (1981) accounted for the cue-dependent nature of SDR by reference to his Spreading Activation Theory. There are converging routes to access a memory, and if the presence of a category cue directs one to the sought-after item, then alternative routes are unnecessary. But without that cue, the alternative routes, which depend on the presence of a congruent state, must be employed. It follows that any overlearned

memory item will be relatively immune to SDR (Bliss, 1973) since there are many access routes. In this vein, Swanson and Kinsbourne (1979) argued that low imagery words exhibit larger SDR effects than high imagery items. Concrete words are much easier to learn than abstract ones, and thus retrieval is not as dependent, if at all, on the presence of contextual cues.

Affective SDR

While SDR effects are well established using drugs, it is not clear that affective states provide distinctive enough boundaries. Do affective contextual cues help a subject to perform a free recall task? And will the absence of such cues seriously impair recall? There are two reasons that affective states are plausible places to find SDR effects. One, it is likely that affective states are mediated by changes in central brain processes, especially in the limbic system. Secondly, self-report suggests that affects are powerful contextual cues whether or not they are mediated through brain states. Research on human memory indicates that any major environmental change diminishes recall though not recognition. Context-dependent retrieval has been demonstrated with scuba-divers on land or under water (Godden & Baddeley, 1975) and with college students in different exam rooms (Smith, Glenberg, & Bjork, 1978). Affects provide an internal context as well as alter the perception of external contexts.

Studies of affective SDR must necessarily differ from drug SDR studies. In the typical drug experiment, the drug is either present or

absent--the subject receives a drug or a placebo. There is no comparable placebo condition in the affect experiment. Affects are never merely present or absent, rather when one is absent another may appear. This situation resembles the design of drug experiments in which the effects of two different drugs are compared with each other. The researcher chooses affective conditions which he assumes are quite different (e.g. happy and sad moods) in order to find an SDR effect. However, this assumption can be dangerous if the two affects are more similar to one another than they are to nonaffective states. For example, intense happiness and intense sadness might be more associated by their emotional turbulence than either one is to a dull, neutral state. The definition of affective states has proven to be extraordinarily murky since they normally exist in "mixed" configurations (Polivy, 1981). If the affective SDR effect is real, then it should be found when affective states are clearly and powerfully defined. In other words, clinical populations are more likely to exhibit it than normal populations who do not have as extreme mood swings. The current literature on affective SDR is limited to one study with a clinical population (Weingartner, Miller, & Murphy, 1977) and to several studies with a normal population receiving laboratory mood induction (Bartlett & Santrock, 1979; Bower, Monteiro, & Gilligan, 1978; Leight & Ellis, 1981; Macht, Spear, & Levis, 1977).

Weingartner, Miller, and Murphy (1977) conducted a study of mood SDR using eight manic-depressive patients with a history of affective

disturbance. The subjects were instructed to form 20 verbal associations to each of two standard nouns, and then their retrieval of these associates was tested 4 days later. This procedure was repeated at 4-day intervals generating 181 pairs of learning-recall observations. Subjects' mood state was measured by a group of self-report and observation-rating mood scales. From these data, absolute changes in mood over the 4-day intervals were calculated. The number of associations retrieved was found to be significantly negatively correlated with absolute change in mood state and with the initial level or intensity of the mood at encoding. On the average, patients in stable nonmanic periods retrieved 8.4 words; patients in stable manic periods retrieved 5.7 words; those changing into mania retrieved 4.4 words, and those moving into normalization of mood retrieved 2.9 words. The mood SDR effect is evident as well as a main effect for mood on the encoding process. Mood change impairs recall, and mania at encoding impairs recall.

Weingartner et al. (1977) cautioned that the recall task was not one of simple retrieval, but involved the regeneration of responses to a word stimulus. The presence of a congruent mood state serves as an aide in the memory search. They suggested that the retrieval process involves a sequential search in which items recalled serve as cues to further recall. In a post-hoc analysis, Weingartner et al. found that sequentially linked pairs of associates were more likely to be recalled in sequence when retrieval occurred in a congruent mood state than in a disparate mood

state. A change in mood seems to impair the sequential retrieval strategies of bipolar patients.

Weingartner and his colleagues have further investigated the main effect for mood on encoding with other groups of hospitalized patients. Manic patients appear to have more idiosyncratic associates to verbal stimuli (Henry, Weingartner, & Murphy, 1971). These subjects show a decreased percentage of high frequency associates in comparison to normal subjects or to themselves when they are in nonmanic periods. Henry et al. (1971) suggested that patients in mania have deficits of organizational processes at encoding which diminish later retrieval. They reported no significant differences in the first learning trial; the deficit appeared only on later trials as the performance of nonmanic controls improved while the manic patient stayed the same. The effect of impaired recall for manic subjects learning a list (of associates in this case) was replicated in the Weingartner et al. (1977) study.

Memory disturbances in depression have received additional study (Miller, 1975). Beck (1974) noted that depressed people often complain of memory difficulties. In general, memory attenuation correlates with the intensity of depression (Henry, Weingartner, & Murphy, 1973; Stromgren, 1977). However, the administration of certain drugs may eradicate the memory deficit without an associated lifting of mood. Either the memory disturbance is not mood-related or the memory improvement is a forerunner and more sensitive measure of clinical improvement (Glass,

Uhlenhuth, Hartel, Matuzas, & Fischman, 1981). The literature on memory research with depressed patients covers many different outcome measures, subject variables and types of encoding processes. This last topic, types of encoding operations preferred, is most important to explain the SDR result. Recently, Weingartner, Cohen, Murphy, Martello, and Gerdt (1981) have found that depressed patients do not self-generate efficient organization for later recall. When presented with such organization they will utilize it, but they do not impose it. Normals, on the other hand, put information into a form useful for later recall.

> It is as if the depressed patient, in processing words, is forming non-transformed copies of the stimulus material as opposed to generating and using encoding processes that would effectively transform and organize information thereby producing more complete learning and recall. (p. 46)

Differences in memory processing between normals and depressed patients are only found on those tasks in which normals can take advantage of their superior functioning. Miller (1975) offered two explanations for the decreased retention and impaired encoding of depressed patients: (a) reduced motivation, or (b) cognitive interference, i. e. the intrusion of distracting thoughts. Leight and Ellis (1981) provided additional support for the hypothesis of processing differences during depression with the Velten (1968) procedure (described below). They noted that depressed mood during training on a letter sequence memory task adversely affects transfer of learning since the subjects do not take advantage of an efficient coding strategy (i. e. chunking). They referred to this problem as one of

cognitive rigidity. Hasher and Zacks (1979) found similar deficits in effortful organization in depressed subjects.

Upon further examination of memory processing in mania and in depression, the SDR effect in bipolar patients begins to make sense. Patients in a manic phase organize and retrieve information in ways which are idiosyncratic, and consequently difficult to recreate when normal or depressed. And patients in a depressed phase encode and retrieve information in ways which show little effortful organization. There seems to be little congruence between the strategies used in disparate phases of the illness, either between mania and depression or between each state and normalcy.

It appears that clinically diagnosed affective patients exhibit the effects of SDR as well as other memory-processing changes. But does an artificially induced transient emotional state also have similar properties? Before reviewing this research, it is important to examine the reliability of laboratory mood inductions. One method (Velten, 1968) has received the greatest amount of attention.

Mood States

The Velten mood induction procedure instructs the subject to read and concentrate on 60 statements (or suggestions) which contain positive, negative or neutral ideation, e.g. "I'm discouraged and unhappy about myself." In Velten's (1968) original study, the depressed subjects showed self-reported depressed affect and psychomotor retardation. He ran two

demand characteristic control conditions in which subjects were asked to pretend to be sad or happy. These groups differed significantly from the experimental groups. Subsequently, many studies have tested the effects of the mood induction on a wide range of behaviors, e.g. reduced enjoyability of activities (Aderman, 1972; Alloy, Abramson, & Viscusi, 1981; Buchwald, Strack, & Coyne, 1981; Coleman, 1975; Hale & Strickland, 1976; Leight & Ellis, 1981; Natale, 1977; Polivy, 1981; Polivy & Doyle, 1980; Raps, Reinhard, & Seligman, 1980; Scheier & Carver, 1977; Strickland, Hale, & Anderson, 1975; Teasdale & Fogarty, 1979; Trimboli, 1973). The experimental groups invariably differed on self-reported affect as well as on many performance measures associated with the depressive syndrome. Some evidence suggests that the mood manipulation is both transient and weak, since it does not effect all performance criteria and since self-reported affect changes as the experiment progresses. Polivy and Doyle (1980) administered the Multiple Affect Adjective Check List (MAACL) twice during their experiment. Scores were significantly lower for all conditions, including the demand characteristic groups, by the second administration. Apparently the mood wanes with time, although subjects in the depressed mood condition continued to report depressed affect.

Recently, the question of whether the mood effect is due to experimenter demand has been raised again. Polivy and Doyle (1980) found that subjects instructed to feel the opposite of the suggestion show neutral moods. In other words, the instructions can cancel out the effects of the

suggestions. While the authors concluded that the mood induction is a function of experimental demand, they acknowledged that mood changes did occur, if only transiently. Another study (Buchwald et al., 1981) has determined that the mood effect is not real, since the subjects appeared only to pretend that they were in the experimental mood. The investigators included strong demand characteristic conditions in which the subjects were permitted to read examples of the suggestions offered to the mood-induction conditions they were supposed to mimic. Then, in a post-experiment interview which stressed honesty, subjects in the experimental conditions did not differ from subjects in the demand characteristic conditions. Buchwald et al. argued that the experimental effects are the result of subjects who pretend to be in a certain mood when they do not actually feel that way. While this study raises questions about the validity of the Velten mood induction, the study itself has demand characteristic problems. An injunction to stress honesty may be interpreted by the subject to mean: "Tell us you didn't really feel that way." Also, the preponderance of experimental effects (e.g. self-reported mood, reaction times, interview performance, and memory organization changes) suggests that the induction must be valid. Naive subjects who pretend to be in a given mood would probably not be able to exhibit certain mood-related behaviors since they would not realize what the experimental predictions are. For example, in the Leight and Ellis (1981) study, it is extremely unlikely that a subject pretending to be depressed would be aware that a depressed person performs certain

types of encoding and organizational operations. While self-reported affect may be simulated without any difficulty, memory-processing changes cannot be. One may therefore conclude that the available evidence suggests that the Velten procedure can effectively induce a genuine depressive mood.

For a mood induction to be effective in memory research, it must produce a distinctive emotional context. Logically, happy and sad moods are distinctive states. However, a mood induction generally produces a cluster of affects, not merely discrete ones (Polivy, 1981). For example, anxiety and hostility often accompany depression. Such ambiguity will interfere with the pure mood SDR effect. Also, the various mood scales which measure elation and depression--the Multiple Affect Adjective Check List (MAACL) or the Depression Adjective Check List (DACL)--seem to measure overall affective trait characteristics as well as transient mood states.

Affective SDR in the Lab

There are four studies of mood SDR using nonclinical populations in the literature (Bartlett & Santrock, 1979; Bower, Monteiro, & Gilligan, 1978; Leight & Ellis, 1981; Macht, Spear, & Levis, 1977). Each study employed a different mood induction. In addition, there is extensive work relating the qualitative effects of various mood states on memory contents. (The latter research will not be reviewed here inasmuch as it does not bear on the SDR phenomenon.) These topics include investigations of Beck's cognitive theory of depression (Kuiper & Derry, 1981; Teasdale &

Fogarty, 1979), of the relative accessibility of pleasant and unpleasant memories (Lloyd & Lishman, 1975; Robinson, 1980; Washburn, Giang, Ives, & Pollack, 1925), of the Pollyanna hypothesis that people tend to recall pleasant events (Matlin & Stang, 1978), and of the alternative hypothesis that people tend to recall mood-consistent information (Bower, 1981; Bower, Gilligan, & Monteiro, 1981); the impact of mood on memory contents has been demonstrated in a number of other studies as well (Dutta, Kanungo, & Freibergs, 1972; Holmes, 1970; Isen, Shalker, Clark, & Karp, 1978). Eventually, an examination of memory content may help to explain the mood SDR effect; however, at present there is no relevant evidence.

The Bartlett and Santrock (1979) study examined the SDR effect in young children using a naturalistic mood induction. Five-year-old subjects had a happy or sad story read to them, accompanied by happy or sad pictures, by a happy or sad experimenter. This design confounds mood state with the content of the to-be-remembered material. It is impossible to tell whether information recalled across congruent mood states is due to an SDR effect or to a recall of mood-consistent information effect. Nevertheless, the experimenters found that incidental recall is greater between congruent mood states, and they mistakenly attributed this result to mood state-dependent-retrieval. While their interpretation of the results was lacking, they had two interesting findings: (a) The mood-congruent pattern is asymmetrical, with the happy-happy condition more superior to the happy-sad condition than the sad-sad condition is to the sad-happy condition;

and (b) the mood-congruent effect is present only in a free recall paradigm, not with cued recall or with recognition tests. The first result is consistent with a Pollyanna hypothesis interpretation, and the second result is consistent with much earlier work (Eich, 1980) as described above.

The Macht, Spear, and Levis (1977) study examined the SDR effect using threat of electric shock as the mood induction. The investigators ran a series of three experiments, each designed according to the standard 2 x 2 matrix of conditions. At first they discovered the predicted SDR interaction effect. However, in the next experiment, which included a measure of GSR, no interaction effect appeared. In Experiment 3, a replication of the initial one, the interaction effect was not found. Macht et al. then performed a post-hoc analysis on the data from Experiments 1 and 3. When only items in early serial positions (1-5) were included for analysis, the SDR effect was present. The authors argued that the inconsistent findings were due to the instability of the emotional state. A trivial and transient manipulation of moods will wear off rapidly or be easily obscured. The distinct emotional context might only apply to the first words learned, and then the mood begins to fade. In other words, an affective SDR effect may be hidden either by a lengthy experimental session or by obtrusive experimental equipment (i.e. GSR electrodes). Considering the ambiguous, post-hoc nature of the findings, the Macht et al. (1977) study must be discounted pending further replication.

Leight and Ellis (1981) tested the affective SDR hypothesis using the

Velten (1968) procedure. Subjects entered either a depressed or neutral mood state, learned letter sequences in varied or constant groupings, and were tested for recall and recognition after a 1-day interval in a similar or different mood state. There were a number of findings of interest: (a) The mood induction is effective according to the Depression Adjective Check List self-report measure and according to a writing speed measure; (b) the level of original learning is equivalent across all experimental conditions; (c) the state-dependent-retrieval effect is not present under varied input groupings; and (d) an asymmetrical SDR effect is present under constant input groupings for the recognition test, but not the free recall test. The authors speculated that under varied input the material is learned well enough that it is not dependent on the representation of a distinctive context, whereas under constant input the material is not accessible without that distinctive context. They further reasoned that only a depressed mood, not a neutral one, will serve as a sufficiently distinctive context to function as an effective retrieval cue. Consequently, one finds an asymmetry. However, the authors failed to explain why the recognition test is sensitive to SDR effects and the free recall test is not. If this finding is legitimate, then it is an anomaly in the entire field of state-dependent retrieval (Eich, 1980).

Bower's (Bower, 1981; Bower, Monteiro, & Gilligan, 1978) research on affective SDR is the most thorough project to date and is the model for the present investigation. He has conducted three experiments with the

SDR paradigm. In each one the subjects were highly susceptible individuals who were hypnotized, asked to imagine a happy or sad scene and then to learn a list of words. When the mood induction was employed again at the time of recall the subject was asked to imagine a completely different scene associated with a happy or sad mood. Instructions to be amnesic for the mood suggestions were given, and the subjects were purportedly unaware of the reason for their emotional state. In Experiment 1, the investigators tested the recall of a list of 16 abstract words immediately, after 10 minutes in the opposite mood, and after 20 minutes in the original mood. Results indicated neither an SDR effect nor a main effect for mood on original learning--in contrast with the Weingartner studies. Since the retention interval was short, Bower increased the delay to 24 hours in Experiment 2. Again, the results showed no SDR interaction effect, no effect of mood on original learning, and nonsignificant trends of encoding mood on later recall and retrieval mood on recall.

Bower et al.'s (1978) final list-learning experiment introduced a clever addition to the SDR paradigm. Recall was measured in terms of the level of retroactive interference. The interference methodology is sensitive to changes in either the learning materials or in the prevailing context. Interference diminishes as the to-be-remembered material is distinct from the interpolated material. This recall task should be more sensitive to contextual differences than the free recall task in itself, and certainly more so than the cued recall or recognition tests. Since the

subject's emotional state provides a powerful contextual cue, there are several predicted hypotheses. One, similarities in the subject's mood state at original learning and at retrieval should enhance recall, and disparities should impair recall. Two, similarities in the subject's mood state at original learning of the interfering list and at retrieval of the to-be-remembered list should hinder recall since interference is maximized. Three, dissimilarities in the subject's mood state at original learning of List 1 and at original learning of List 2 should minimize interference and consequently improve recall.

In Experiment 3, Bower's mood induction remained the same. The interval between mood induction for learning List 1 and mood induction for learning List 2 was 1 minute; and the interval between learning List 2 and mood induction for recall was 12 minutes, which consisted of performing a distractor task. Bower defined six experimental conditions of interest. Using first and second letters to denote mood states during learning of List 1 and List 2, and the third letter to denote mood during recall of both lists, the six conditions were: SHH and HSS (Maximum Interference for List 1); HHH and SSS (Control); and SHS and HSH (Minimum Interference for List 1).

In marked contrast to the Weingartner studies with patient populations, mood state affected neither original learning nor final recall (when comparisons were made within each category--Maximum, Minimum and Control). While original learning of List 1 and List 2 was equal, the final

recall of these lists substantiated the predicted hypotheses: Recall of List 1 is highest in the Minimum Interference condition and lowest in the Maximum Interference condition; and recall of List 2 is just the opposite. Using a within-subject comparison, the Maximum and Minimum groups differ significantly on List 1 minus List 2 retention. In conclusion, recall is best when mood state at learning matches mood state at recall and differs from mood state at learning an interfering list; recall is worst when mood state at learning differs from mood state at recall and mood state at learning an interfering list matches retrieval mood state. Discussing these results, Bower speculated about the mood SDR phenomenon. He wondered why the effect appeared in the interference experiment but not in the immediate and delayed recall ones. Possibly the emotional mood serves as a redundant cue which is unnecessary in the typical free recall experiment. However, in an interference task, when the target information is easily confusable with extraneous information, then the emotional mood (when available) provides a necessary differentiating context.

Bower's studies provided a demonstration of the selectivity of learning under different mood states. However, he confounded this selectivity with SDR. In the interference task, there were two experimental effects which converged to show selectivity: an interference effect and an SDR effect. The SDR effect consisted of congruent mood states at learning and at recall. The interference effect, when interference was low, consisted of dissimilarities between the two lists to be learned. Bower's results did

not differentiate the effects of low interference from the effects of positive SDR. The research described in this paper teased out three logically distinct effects. A second criticism of Bower's work centered on his mood induction. The hypnotic induction was not standardized, required a unique subject population, and Bower neglected to measure its success with any sort of mood scale.

This Study

The present experiment was designed to replicate and to elucidate further the results found in Bower's interference task experiment. Several changes were involved. One, a neutral mood condition was added to differentiate the interference effect from the SDR effect. Two, the target lists were composed of free associations rather than of experimenter-generated words. Subjects provided free associations to each of 20 stimulus words. The stimulus words were equally divided between words which had high frequency free associations and those which had low frequency free associations. As Weingartner et al.'s (1977) research suggested, recall of free associations may be more state-dependent than recall of experimenter-generated word lists. Or possibly, only recall of idiosyncratic associations will be state-dependent, while obvious free associations can be recalled across mood states. It may also be possible to find a main effect for mood on original learning or on final recall using the free associations but not the stimulus words.

Three, Bower's experiment took place during 30 minutes with a retention interval of approximately 12 minutes. In this experiment, the subjects participated over 3 days with a retention interval ranging from 1-2 days. They learned the word lists on Days 1 and 2 and took the recall test on Day 3. Four, the Velten (1968) procedure with a mood scale rating replaced the hypnotic mood induction. To control for the effectiveness of the Velten method, three simulator control groups were also run, although it was unlikely that a subject responding to the experimental demand characteristics could deduce the complicated configuration of memory results.

With the inclusion of a neutral mood condition, seven experimental groups and three control groups were defined (see Figure 1). Each of these experimental groups and the predicted effects is contingent on a linear conception of emotions. That is, happy and sad moods are quite dissimilar, and a neutral mood is more similar to either one they they are to each other. If the happy and sad states were more similar to each other than they were to the neutral state (e.g. by virtue of their emotional intensity), then these predictions would not hold true. These predictions are defined by similarities in the emotional context; the greater the similarity, the higher the interference and the higher the state-dependency.

Groups 1, 5 and 7 are analogous to those run by Bower. The pure effect of SDR may be measured by comparing Groups 1 and 2, and Groups 3 and 5. An enhanced effect of SDR may be measured by comparing Groups

H, S, N -- induced mood

HC, SC -- simulator control

GROUP--described in relation to predicted effects on recall of List 1	Subjects	Day 1	Day 2	Day 3
1) Hi interference and positive SDR	10	H	H	H
2) Hi interference	7	H	H	N
3) Lo interference	8	H	S	N
4) Positive SDR	8	H	N	H
5) Lo interference and positive SDR	11	H	S	H
6) Negative SDR	7	H	N	S
7) Lo interference and negative SDR	10	H	S	S
8) HHH control	8	HC	HC	HC
9) HSH control	7	HC	SC	HC
10) HSS control	6	HC	SC	SC
	82			

Figure 1. Experimental and Control Conditions.

4 and 6, and Groups 5 and 7. The effects of interference may be measured by comparing Groups 2 and 3, Groups 1 and 4, Groups 1 and 5, and Groups 4 and 5. Comparisons may also be made using the recall of List 2. An SDR effect may be measured by comparing Groups 1 and 2, and Groups 3 and 7. An enhanced effect of SDR may be measured by comparing Groups 5 and 7. The effect of interference may be measured by comparing Groups 2 and 3, and Groups 1 and 7. These complicated set of predictions apply both to recall of free associations and to recall of stimulus words.

METHODS

Subjects

Ninety-one volunteers from the Duke University summer school and the Duke University psychology subject pool participated in the experiment. The subject pool students received 3 hours of experimental credit. Sign-up sheets announced that the study investigated the effects of mood on memory. The participants were randomly assigned to seven experimental conditions and three control conditions (as in Figure 1).

Procedure

Experimental procedure was identical for all 10 conditions, differing only in the mood induction or control instruction used. On Day 1, all subjects were given a packet containing the experimental materials. The instructions listed four steps: (1) the mood induction or control instruction, (2) a mood scale, (3) a free association test, and (4) a recall test of the free associations. The mood induction consisted of the 60 Velten (1968) elation statements typed on 2-inch x 4-inch pieces of paper with accompanying instructions (see Appendix A). Subjects had 15 seconds to read and study each statement before they were signalled to move on to the next. This phase took 15 minutes. The happy control condition instructions

described a happy mood and asked the subjects to mimic that mood for the remainder of the experiment (see Appendix B). This phase took $2^1/2$ minutes.

For step two, all subjects received a Depression Adjective Check List (Lubin, 1967) (see Appendix C). This checklist consisted of 34 adjectives with either happy or sad connotations. Subjects were asked to check those words which described their mood at the present moment. Scores ranged from 0 (elated) to 34 (depressed). Since scores on the DACL indicated that the mood induction was not always successful, those subjects whose mood ratings were in the outlying 10th percentile of their mood condition were excluded from the data analysis. Consequently, data from nine subjects were not included in the following analyses.

For step three, all subjects received a list of 20 stimulus words presented individually on the pieces of paper. They were instructed to write down the first word which came to mind in the adjacent space. According to Toglia and Battig's (1978) 7-point word norms, the stimulus words were controlled for concreteness (range 3.47-6.18) and pleasantness (range 3.27-4.72). According to Russell and Jenkins' (1954) update of the Kent-Rosanoff word norms, 10 stimulus words had high frequency first associates (range 397-840 out of 900) and 10 stimulus words had low frequency first associates (range 131-348 out of 900). The 20 words from List 1 are given in Appendix D. Subjects had 10 seconds to write down each free association.

For step four, all subjects were immediately asked to recall as many of their free associations as they could in $2^1/2$ minutes. This recall test is referred to as a test of original learning of List 1 free associates. The subjects were dismissed and asked to return at the same time on the next day.

On Day 2, the experimental procedure was identical to that on Day 1 except for different mood inductions and/or control instructions, and a new list of stimulus words. The mood induction consisted of either Velten's elation, depression or neutral statements (see Appendix A). The control instructions requested that the subject mimic either a happy or a sad mood, as appropriate by design (see Appendix B). List 2 stimulus words were controlled for concreteness (range 3.71-6.24) and pleasantness (range 3.39-4.62). Again, they were divided into 10 words with high frequency first associates (range 372-829 out of 900) and 10 words with low frequency first associates (range 114-348) (see Appendix D).

On Day 3, subjects were given one of three Velten mood inductions or one of two control instructions. Once again they completed the DACL. At this time, they were asked to recall the word lists from the previous 2 days. There were four final recall tests in all. The time limit for each test was $2^1/2$ minutes. In order, they were:

1. List 1 free associates
2. List 2 free associates
3. List 1 stimulus words
4. List 2 stimulus words.

With the completion of this phase, the data collection was concluded.

Seven dependent measures were defined:

1. Original learning of List 1 free associates
2. Original learning of List 2 free associates
3. Final recall of List 1 free associates
4. Final recall of List 2 free associates
5. Final recall of List 1 stimulus words
6. Final recall of List 2 stimulus words
7. Intrusions--those words learned on one day but attributed to the other day.

RESULTS

Mood Induction Manipulation Check

According to the scores on the DACL, the mood inductions were successful on each of the three days. The happy group scored lower (i.e. happier) than the neutral group, which scored lower than the sad group (see Table 1). It is interesting to note that the two control groups--subjects imitating happy or sad mood states--placed on the extremes of the mood scale. This result replicates Velten's (1968) original finding that the demand characteristic control groups overestimate the potency of certain mood states.

Original Learning

Mood state on Days 1 and 2 did not influence the level of original learning. Subjects in the various mood states showed no significant differences in learning of free associates (see Table 2). In addition, learning of List 1 associates did not differ from learning of List 2 associates. Any differences at final recall cannot be attributed to the degree of original learning.

Mood on Day 3

Among the experimental groups, mood on Day 3 had no effect on final recall of any word list. However, the sad control group showed a

Table 1

Mood Ratings

	DACL mean score
Day 1	
Happy Control	2.2
Happy	4.4
Day 2	
Happy Control	1.8
Happy	6.4
Neutral	14.8
Sad	23.2
Sad Control	32.2
Day 3	
Happy Control	2.3
Happy	3.8
Neutral	11.3
Sad	18.4
Sad Control	32.7

Table 2

Original Learning (of Free Associates)

	Original learning
Day 1	
Happy	11.1
Happy Control	11.8
Day 2	
Happy	12.5
Happy Control	11.9
Neutral	11.7
Sad	11.3
Sad Control	10.7

significant decrease in the recall of Day 2 stimulus words ($\underline{p} < .01$) and of Day 2 free associates ($\underline{p} < .05$) as compared with all other groups. This finding suggests that subjects imitating a depressed mood state overestimate the memory deficit due to that mood state. While it remains unclear why this deficit is limited to Day 2 word lists, it is possible to interpret this result in terms of the experimental design. The only condition in which subjects pretended to be sad on Day 3 is one in which they also pretended to be sad on Day 2 (the HSS control group). One plausible explanation of the finding is that the sad control group overestimated their memory deficit from another day when they pretended to be sad, but not from a day when they pretended to be happy.

Final Recall

Table 3 gives the final recall means for the seven experimental groups and three control groups. Six dependent measures were calculated (three for each day): the number of free associates recalled (FAR), the number of stimulus words recalled (SWR), and the arc sine of the ratio free associates recalled to free associates originally learned (arc sine FAR/OL). This latter measure is included as suggested by Bower, Monteiro, and Gilligan (1978).

Nineteen planned comparisons between group means were examined. Seven comparisons were intended to evaluate the state-dependent retrieval effect:

1. HHH vs. HHN for Day 1 word lists--no significant differences,

Table 3

Final Recall

Groups	Day 1 free associates recalled	Day 1 stimulus words recalled	Day 1 arc sine FAR/OL	Day 2 free associates recalled	Day 2 stimulus words recalled	Day 2 arc sine FAR/OL
1) HHH	5.7	5.2	.57	5.6	5.5	.51
2) HHN	4.9	4.3	.44	7.0	5.4	.56
3) HSN	5.5	4.8	.49	5.5	4.8	.50
4) HNH	4.6	4.1	.42	5.9	5.6	.57
5) HSH	4.5	4.2	.50	5.5	4.2	.58
6) HNS	4.1	4.0	.46	6.3	4.3	.55
7) HSS	4.8	4.8	.47	7.5	5.9	.75
8) HHH Control	3.6	3.8	.32	7.5	6.1	.72
9) HSH Control	5.4	5.4	.43	6.6	6.6	.55
10) HSS Control	4.5	4.5	.50	3.2	2.3	.34

2. HSH vs. HSN for Day 1 word lists--no significant differences,
3. HNH vs. HNS for Day 1 word lists--no significant differences,
4. HSH vs. HSS for Day 1 word lists--no significant differences,
5. HHH vs. HHN for Day 2 word lists--no significant differences,
6. HSS vs. HSN for Day 2 word lists--no significant differences,
7. HSS vs. HSH for Day 2 word lists--for SWR HSS > HSH ($\underline{p} < .05$); nonsignificant trend for FAR and arc sine FAR/OL.

Considering the number of planned comparisons performed, the significance of comparison 7 may be attributed to chance. However, in terms of evaluating the state-dependent retrieval effect, comparison 7 was the only planned comparison to satisfy two criteria: (a) The congruent mood conditions were sad moods, and (b) positive SDR was compared with negative SDR. This finding suggests that the mood SDR effect is asymmetrical; it appears only between sad mood states, not happy ones. The finding also suggests that the effect is weak enough not to be significant in nonextreme comparisons (i.e. comparison 6) or with different types of word lists (i.e. free associates).

Six comparisons were intended to evaluate the interference effect:

8. HSN vs. HHN for Day 1 word lists--no significant differences,
9. HNH vs. HHH for Day 1 word lists--no significant differences,
10. HSH vs. HHH for Day 1 word lists--no significant differences,
11. HSH vs. HNH for Day 1 word lists--no significant differences,
12. HSN vs. HHN for Day 2 word lists--no significant differences,

13. HSS vs. HHH for Day 2 word lists--no significant differences. The interference effect was not found.

Six comparisons are intended to evaluate differences between the mood inductions and the control instructions:

14. HHH vs. HHH control for Day 1 word lists--for arc sine FAR/OL HHH > HHH control ($p < .05$); nonsignificant trend for FAR and SWR,
15. HHH vs. HHH control for Day 2 word lists--no significant differences,
16. HSH vs. HSH control for Day 1 word lists--no significant differences,
17. HSH vs. HSH control for Day 2 word lists--for SWR HSH control > HSH ($p < .01$),
18. HSS vs. HSS control for Day 1 word lists--no significant differences,
19. HSS vs. HSS control for Day 2 word lists--for SWR ($p < .001$), FAR ($p < .002$), and arc sine FAR/OL ($p < .01$) HSS > HSS control.

The significance of comparison 14 is difficult to interpret in the context of nonsignificant results for the other dependent measures, an opposite trend for Day 2 word lists (comparison 15), and the absence of an SDR effect for other happy mood comparisons. This finding may be due to chance probability. Comparions 17 and 19 had a higher level of significance and they

are easier to explain. Comparison 17 tested a control group against a negative SDR group. Comparison 19 tested a control group against a positive SDR group. As predicted, the positive SDR group showed greater recall than the control condition, and the negative SDR group showed poorer recall than the control condition. This result appeared only when a sad mood state was involved (although comparison 18 showed no differences). The high level of significance of comparison 19 was due to a mistaken expectation on the part of the sad control group that people who are sad have a memory deficit for other days when they were sad; in fact, people who are sad have enhanced recall for other days when they were sad.

Low Frequency First Associate Words

One experimental prediction involved the use of stimulus words with highly idiosyncratic first associates. All of the 19 comparisons were performed on words with low frequency first associates (see Table 4). There were no significant differences on original learning for either Day 1 or Day 2 as a result of mood. There were no differences on final recall as a result of mood on Day 3. Six planned comparisons had significant results:

1. HSS > HSN ($\underline{p} < .05$) for Day 2 FAR,
2. HSS > HSH ($\underline{p} < .05$) for Day 2 FAR and Day 2 SWR,
3. HHN > HSN ($\underline{p} < .05$) for Day 2 FAR,
4. HHH > HHH control for Day 1 FAR ($\underline{p} < .05$) and Day 1 arc sine FAR/OL ($\underline{p} < .005$),

Table 4

Low Frequency First Associate Words

Day 1	Original learning
Happy	6.2
Happy Control	6.3
Day 2	
Happy	6.8
Happy Control	6.4
Neutral	5.9
Sad	5.8
Sad Control	5.8

Groups	Day 1 free associates recalled	Day 1 stimulus words recalled	Day 1 arc sine FAR/OL	Day 2 free associates recalled	Day 2 stimulus words recalled	Day 2 arc sine FAR/OL
1) HHH	3.3	2.8	.60	3.2	3.2	.58
2) HHN	3.1	2.6	.54	4.1	3.4	.74
3) HSN	3.1	2.8	.55	2.5	2.3	.51
4) HNH	2.8	2.6	.40	3.1	3.1	.62
5) HSH	2.5	2.4	.39	2.6	2.1	.50
6) HNS	2.3	2.3	.44	2.7	1.7	.46
7) HSS	2.8	2.8	.54	4.0	3.2	.64
8) HHH Control	1.6	1.6	.23	3.9	3.3	.81
9) HSH Control	3.3	3.0	.52	3.4	3.6	.57
10) HSS Control	2.2	2.8	.48	2.0	1.8	.38

5. HSH control > HSH ($p < .05$) for Day 2 SWR,
6. HSS > HSS control ($p < .01$) for Day 2 FAR.

By restricting the analysis to low frequency first associate words, two additional comparisons reach a level of significance (1 and 3), and in two comparisons the FAR measure is now significant (2 and 4). Comparison 1 reflected the asymmetrical SDR effect in nonextreme conditions which was also present in the extreme conditions (comparison 2). Comparison 3 was intended to test the interference effect. However, the data turned out to be significant in the opposite of the predicted direction. This finding might be due to similarities between a happy mood state and a neutral mood state. If a happy mood and a neutral mood are more similar than a sad mood and a neutral mood, then comparison 3 tested positive SDR against negative SDR. Of course, this interpretation cannot explain the absence of a similar finding for the comparison of HNH vs. HNS for Day 1 word lists (as well as HSH vs. HSS for Day 1 word lists).

High Frequency First Associate Words

The same comparisons were performed using the high frequency first associate words (see Table 5). There were no differences on original learning for either Day 1 or Day 2 as a result of mood. However, pretending to be in a sad mood on Day 3 proved to reduce Day 2 FAR ($p < .02$) and Day 2 SWR ($p < .01$) in contrast to the other mood conditions. Only one planned comparison was significant:

Table 5

High Frequency First Associate Words

Day 1	Original learning
Happy	4.9
Happy Control	5.4
Day 2	
Happy	5.7
Happy Control	5.5
Neutral	5.8
Sad	5.4
Sad Control	4.9

Groups	Day 1 free associates recalled	Day 1 stimulus words recalled	Day 1 arc sine FAR/OL	Day 2 free associates recalled	Day 2 stimulus words recalled	Day 2 arc sine FAR/OL
1) HHH	2.4	2.4	.47	2.4	2.3	.50
2) HHN	1.7	1.7	.34	2.9	2.0	.58
3) HSN	2.4	2.0	.57	3.0	2.5	.54
4) HNH	1.9	1.5	.33	2.8	2.5	.55
5) HSH	2.0	1.8	.58	2.8	2.1	.61
6) HNS	1.9	1.7	.26	3.6	2.6	.67
7) HSS	2.0	2.0	.42	3.5	2.7	.64
8) HHH Control	2.0	2.1	.30	3.6	2.9	.74
9) HSH Control	2.1	2.4	.34	3.1	3.0	.55
10) HSS Control	2.3	1.7	.65	1.2	0.5	.33

1. HSS > HSS control for Day 2 FAR ($p < .01$) and Day 2 SWR ($p < .005$).

The asymmetrical SDR effect is less apparent when only high frequency first associate words are included in the analysis.

Intrusions

The interference effect was also tested using the number of intrusions from the other day's word lists as the dependent measure. It was predicted that groups with high interference will have more intrusions than groups with low interference. Three planned comparisons (see Table 6) tested the differences between groups learning the lists under high interference (HHH and HHN), under moderate interference (HNH and HNS), and under low interference (HSH, HSN and HSS):

1. HHH plus HHN vs. HSH plus HSN plus HSS--no significant differences,
2. HHH plus HHN vs. HNH plus HNS--no significant differences,
3. HNH plus HNS vs. HSH plus HSN plus HSS--no significant differences.

The interference effect on the number of intrusions was not present.

Individual Word Analyses

The five most frequently recalled stimulus words were: DOCTOR, PRIEST, YELLOW, BIBLE and TABLE* (words with asterisks have high frequency first associates). The five most frequently recalled free

Table 6

Intrusions

Groups	# other day intrusions
HHH	2.9
HHN	3.9
HNH	4.9
HNS	3.0
HSH	4.1
HSN	5.4
HSS	4.8

associates were to the following stimulus words: BIBLE, DARK*, TABLE*, YELLOW and RELIGION. Eighty-three percent of the words recalled are recalled in pairs (when both stimulus word and free associate are recalled). Eighty-five percent of the free associates finally recalled were originally learned. That is to say, 15% of the FAR were not reported at the test of original learning.

Comparisons were made between words with high frequency first associates and words with low frequency first associates across all 10 conditions. The low frequency free associate word lists had higher levels of final recall and original learning on both days. In only one case (Day 2 FAR) was this difference not significant (see Table 7). This suggests that words with idiosyncratic associations exhibit less interference and leave a more lasting impact on our memory.

Table 7

High and Low Frequency First Associate Comparisons

	Day 1 original learning	Day 2 original learning	Day 1 free associates recalled	Day 2 free associates recalled	Day 1 stimulus words recalled	Day 2 stimulus words recalled
Hi	5.1	5.5	2.1	2.9	2.0	2.3
Lo	6.1***	6.0*	2.7**	3.1	2.6**	2.8*

*$p < .05$.

**$p < .01$.

***$p < .001$.

DISCUSSION

The primary goal of this study was to replicate and to further elaborate on Bower's (Bower, Monteiro, & Gilligan, 1978) mood SDR finding. These data do not replicate the original finding, much less tease out the interference effect from the SDR effect. Three modifications of his experimental design may account for this failure to replicate. One, Bower's hypnotic mood induction with highly susceptible subjects might create a more powerful and distinctive emotional context than the Velten procedure does with a random subject population. Two, Bower's shorter retention interval (12-20 minutes) might be more sensitive to recall differences than the one used in this study (24-48 hours). Three, his use of experimenter-provided word lists might be more sensitive to differences in memory processing than subject-generated word lists. However, this final modification will be ignored since recall of the stimulus word lists represents a point of commonality between the two studies.

It would appear that a retention interval of 1-2 days is too lengthy. Yet Leight and Ellis (1981) found mood-related changes in memory performance over equally long retention intervals (i.e. 24 hours). Their experiment involved the learning of letter sequences, not word lists, and

they found a mood effect on the recognition task, not on free recall. In other words, certain memory differences do persist over a 24-hour interval.

Since the length of the retention interval probably does not account for the failure to replicate, the mood induction must. Previous investigators (Leight & Ellis, 1981), using the Velten procedure, found only an asymmetrical SDR effect: memory enhancement for the Sad-Sad condition. There was no evidence that the happy or neutral mood inductions can produce SDR results. They concluded that only the depression induction creates a distinctive enough emotional context. In contrast, Bower's hypnotic mood induction can produce equally powerful happy and sad moods, and he consequently found a symmetrical SDR effect.

A review of the Velten procedure literature indicates that the depression induction is more successful than the elation induction. On a variety of measures, a sad mood differed from a neutral or happy one, but a happy mood did not differ from a neutral one. In other words, a sad emotional state may be distinguished from a normal one, but a happy state may not be. Since the SDR effect depends on the distinctiveness of the emotional state, it is unlikely that the elation induction could produce an SDR effect.

SDR Effect

This study provides inconclusive evidence of an asymmetrical SDR effect. Only one condition (HSS for Day 2 word lists) tested recall between two sad mood states. This group showed significantly better recall than

two of three comparison groups: HSH on SWR and HSS control on all measures. When only low frequency first associate words were analyzed, the HSS group recalled more free associates than all three comparison groups: HSH, HSN, and HSS control. One may therefore conclude that the positive SDR effect for sad mood states was present with the qualification that only one condition tested the hypothesis.

Another prediction of the asymmetrical SDR hypothesis is that negative SDR groups should have poorer recall than the relevant comparison groups. Evidence for this finding was much more inconclusive than for the positive SDR effect. Negative SDR comparisons were significant in two cases when the low frequency first associate words were analyzed: HSH control > HSH for Day 2 SWR, and HHN > HSN for Day 2 FAR. They were absent in at least 11 other comparisons performed. If the negative SDR effect with a sad mood state does exist at all, it is quite tenuous.

The positive SDR effect for happy mood states was absent in all but one comparison: HHN > HHH control for Day 1 arc sine FAR/OL. This result is anomalous since other comparisons were not significant. Why was the effect not present for the HHH control comparison for Day 2 word lists, for the HSH control comparison for Day 1 word lists, and for all the relevant experimental comparisons? No explanation is forthcoming. To summarize the SDR results, there was a positive SDR effect for sad mood states, no positive SDR effect for happy mood states, and a tenuous negative SDR effect.

Interference Effect

None of the interference comparisons were significant either for recall of word lists or for number of intrusions. However, this experimental design proved to be a poor test of that hypothesis. The happy induction did not create a distinctive enough context, and high interference was never tested by learning List 1 and List 2 in sad mood states. Before one can definitively conclude that Bower's findings were *not* due to interference, the interference hypothesis must be subjected to a more appropriate investigation.

Word Type

The results indicate that words differing in terms of the frequency of their first associates, but comparable in terms of pleasantness and concreteness, showed different levels of original learning and final recall. Stimulus words with idiosyncratic associations and those associations were learned and recalled better than words with obvious associations. These words appear to form rich and elaborate memory traces that enhance recall and decrease interference (Craik & Jacoby, 1979). When analyses are limited to words with low frequency first associate words, then the SDR effect is more apparent. Words that generate idiosyncratic associations are more dependent on the reinduction of that mood state (i. e. sad) for recall than are words with common associations. The mood state seems to provide the necessary retrieval cues. For high frequency first associate words, these retrieval cues are unnecessary.

While in the overall analyses the stimulus word lists showed greater state-dependency than the free associate lists, in the low frequency first associate analyses both kinds of word lists showed state-dependency. Since the stimulus words are not self-generated and are not tested for original learning, it might be possible that they are less well learned, and consequently their retrieval would be more sensitive to contextual cues. However, there was little evidence for this conclusion. In fact, recall of stimulus words and free associates were interdependent. The great majority of the words recalled were recalled in pairs; that is, a subject recalled both the stimulus word and its free associate.

Control Conditions

The control groups were included to test the demand characteristics of the experimental situation. They offer information concerning a naive subject's preconceptions about moods and memory. Scores on the DACL indicated that the simulator controls overestimated the potency of the mood states. They consistently scored on the extremes of the mood scale. In reality the mood inductions produced less powerful emotional states.

The control group that was pretending to be sad at final recall had severely impaired recall for the previous day's word lists when they were also pretending to be sad. It appears that naive subjects expect depressed people to have poor recall for other days when they were depressed. Contrary to this preconception, truly depressed subjects showed enhanced recall for another day when they were depressed. This implicit theory

about the effects of mood on memory, especially such an incorrect one, requires further investigation.

Implications for Future Research

Future research must confirm the asymmetrical SDR finding with additional experimental groups. By reversing sad and happy mood states in the present experimental design, each theoretical prediction will remain the same. Positive SDR will test recall across congruent sad mood states. Similarly, high interference will test the effects of learning two word lists in sad mood states. The greater effectiveness of the sad mood induction permits a more thorough examination of SDR and interference. At present, the Velten happy mood induction is inadequate for testing these recall differences. A new happy mood induction is needed, one that is as successful as Bower's hypnotic induction.

In my opinion, the field of cognitive psychology has much to offer to the understanding of issues in clinical and personality psychology. For example, mood states (or a successful mood induction) may be defined by parameters of memory. Any mood induction which is powerful or distinctive enough to generate differences in memory performance has been empirically proven to be successful. Inasmuch as mood can function as a necessary retrieval cue, then the success or failure of recall points to the presence or absence of the given mood. And similarities between mood states may then be tested by using them as different retrieval cues.

APPENDIX A

MOOD INDUCTION STATEMENTS AND INSTRUCTIONS

In the first part of this experiment, I will be shown a series of cards with statements typed on them. These statements represent a certain mood. My sucess will be largely a question of my willingness to be receptive and responsive to the idea in each statement, and to allow each idea to act upon me without interference. These ideas are called suggestions.

First, as I see each statement, I will simply read it to myself, and then I will read it once again in a manner appropriate to its intended seriousness. Then I'll go over each statement again and again in my head with the determination and willingness to really believe it. I will experience each idea. I will concentrate my full attention on it. And I will exclude other ideas which are unrelated to the mood---like, "I'll see if this will work."

I will always attempt to respond to the feeling suggested by each item. I will then try to think of myself with as much clarity and realism as possible as definitely being and moving into that mood state. I am letting myself be receptive to these feelings. Different people move into moods in different ways. Whatever induces the mood in me fastest and most deeply is the best way for me. Some people simply repeat the statements over and over again to themselves with the intention of experiencing them.

Some people find it natural and easy for them to visualize a scene in which they had or would have had such a feeling or thought. Or, perhaps some easy combination of repeating the statement and imagining scenes will come to me. Very likely, I will begin to feel the way I do when I'm in that mood. I will continue to concentrate my full consciousness on experiencing and retaining the mood as I see each suggestion. I will continue to discipline and train myself in inducing a mood in myself by concentrating my full attention on the mood-statements during any time interval.

To sum up: The whole purpose of this experiment is to see whether a person can talk himself into a mood. Somce of these mood-statements may have no relation to anything I have ever thought, said, or done. Yet, exactly in the manner of hypnosis, I will find it quite easy to accept and feel these emotions. I will be concentrating on doing so, rather than comparing each single statement to my life experience and then deciding whether it applies to me. I will let and strive to let them apply to me. I can do this.

I experience each statement as if it were especially written for me. At first I may feel the impulse to compare a single mood-statement to my life experience, or to resist statements which seem to be or are contradictory to what I feel myself to be. But, most people feel this at first. It will become apparent to me that if I am able to talk myself into a mood, then obviously I know how to talk myself out of one. If I find that I can do these things, then I have learned something valuable about myself: I can learn to control my moods to an extent.

If I feel the urge to laugh, it will probably be because humor is a good way to counteract unwanted feelings----or it might be because I am surprised that I really _am_ going into the mood. I will try to avoid these reactions, however, by keeping in mind that I have the chance of acquiring extremely useful information about myself and how to help myself out of undesirable moods that occur in everyday life. _If for any reason I feel I cannot continue, I will so indicate._

The next card will begin the series of statements. I will read each statement to myself and then I will go over it again and again with the determination and willingness to really believe it. Then I will try to experience the mood as well as I can and continue to do so until the experimenter signals that I should turn to the next card and I move further into the mood.

MOOD-STATEMENTS FOR DEPRESSION TREATMENT SUBJECTS

1. TODAY IS NEITHER BETTER NOR WORSE THAN ANY OTHER DAY
2. HOWEVER, I FEEL A LITTLE LOW TODAY
3. I FEEL RATHER SLUGGISH NOW
4. SOMETIMES I WONDER WHETHER SCHOOL IS ALL THAT WORTHWHILE
5. EVERY NOW AND THEN I FEEL SO TIRED AND GLOOMY THAT I'D RATHER JUST SIT THAN DO ANYTHING
6. I CAN REMEMBER TIMES WHEN EVERYDOBY BUT ME SEEMED FULL OF ENERGY
7. TOO OFTEN I HAVE FOUND MYSELF STARING LISTLESSLY INTO THE DISTANCE, MY MIND A BLANK, WHEN I DEFINITELY SHOULD HAVE BEEN STUDYING
8. IT HAS OCCURRED TO ME MORE THAN ONCE THAT STUDY IS BASICALLY USELESS, BECAUSE YOU FORGET ALMOST EVERYTHING YOU LEARN ANYWAY
9. PEOPLE ANNOY ME; I WISH I COULD BE BY MYSELF
10. I'VE HAD IMPORTANT DECISIONS TO MAKE IN THE PAST, AND I'VE SOMETIMES MADE THE WRONG ONES
11. I DO FEEL SOMEWHAT DISCOURAGED AND DROWSY----MAYBE I'LL NEED A NAP WHEN I GET HOME
12. PERHAPS COLLEGE TAKES MORE TIME, EFFORT, AND MONEY THAN IT'S WORTH
13. I'M AFRAID THE WAR IN THE MIDDLE EAST MAY GET A LOT WORSE
14. I JUST DON'T SEEM TO BE ABLE TO GET GOING AS FAST AS I USED TO
15. THERE HAVE BEEN DAYS WHEN I FELT WEAK AND CONFUSED, AND EVERYTHING WENT MISERABLY WRONG
16. JUST A LITTLE BIT OF EFFORT TIRES ME OUT
17. I'VE HAD DAYDREAMS IN WHICH MY MISTAKES KEPT OCCURRING TO ME----SOMETIMES I WISH I COULD START OVER AGAIN
18. I'M ASHAMED THAT I'VE CAUSED MY PARENTS NEEDLESS WORRY
19. I FEEL TERRIBLY TIRED AND INDIFFERENT TO THINGS TODAY
20. JUST TO STAND UP WOULD TAKE A BIG EFFORT
21. I'M GETTING TIRED OUT; I CAN FEEL MY BODY GETTING EXHAUSTED AND HEAVY
22. I'M BEGINNING TO FEEL SLEEPY; MY THOUGHTS ARE DRIFTING
23. AT TIMES I'VE BEEN SO TIRED AND DISCOURAGED THAT I WENT TO SLEEP RATHER THAN FACE IMPORTANT PROBLEMS
24. MY LIFE IS SO TIRESOME----THE SAME OLD THING DAY AFTER DAY DEPRESSES ME
25. I COULDN'T REMEMBER THINGS WELL RIGHT NOW IF I HAD TO
26. I JUST CAN'T MAKE UP MY MIND; IT'S SO HARD TO MAKE SIMPLE DECISIONS

27. I WANT TO GO TO SLEEP----I FEEL LIKE JUST CLOSING MY EYES AND GOING TO SLEEP RIGHT HERE
28. I'M NOT VERY ALERT; I FEEL LISTLESS AND VAGUELY SAD
29. I'VE DOUBTED THAT I'M A WORTHWHILE PERSON
30. I FEEL WORN OUT; MY HEALTH MAY NOT BE AS GOOD AS IT'S SUPPOSED TO BE
31. IT OFTEN SEEMS THAT NO MATTER HOW HARD I TRY, THINGS STILL GO WRONG
32. I'VE NOTICED THAT NO ONE SEEMS TO REALLY UNDERSTAND OR CARE WHEN I COMPLAIN OR FEEL UNHAPPY
33. I'M UNCERTAIN ABOUT MY FUTURE
34. I'M DISCOURAGED AND UNHAPPY ABOUT MYSELF
35. I'VE LAIN AWAKE AT NIGHT WORRYING SO LONG THAT I HATED MYSELF
36. THINGS ARE WORSE NOW THAN WHEN I WAS YOUNGER
37. THE WAY I FEEL NOW, THE FUTURE LOOKS BORING AND HOPELESS
38. MY PARENTS NEVER REALLY TRIED TO UNDERSTAND ME
39. SOME VERY IMPORTANT DECISIONS ARE ALMOST IMPOSSIBLE FOR ME TO MAKE
40. I FEEL TIRED AND DEPRESSED; I DON'T FEEL LIKE WORKING ON THE THINGS THAT I KNOW I MUST GET DONE
41. I FEEL HORRIBLY GUILTY ABOUT HOW I'VE TREATED MY PARENTS AT TIMES
42. I HAVE THE FEELING THAT I JUST CAN'T REACH PEOPLE
43. THINGS ARE EASIER AND BETTER FOR OTHER PEOPLE THAN FOR ME; I FEEL LIKE THERE'S NO USE IN TRYING AGAIN
44. OFTEN PEOPLE MAKE ME VERY UPSET; I DON'T LIKE TO BE AROUND THEM
45. IT TAKES TOO MUCH EFFORT TO CONVINCE PEOPLE OF ANYTHING; THERE'S NO POINT IN TRYING
46. I FAIL IN COMMUNICATING WITH PEOPLE ABOUT MY PROBLEMS
47. IT'S SO DISCOURAGING THE WAY PEOPLE DON'T REALLY LISTEN TO ME
48. I'VE FELT SO ALONE BEFORE THAT I COULD HAVE CRIED
49. SOMETIMES I'VE WISHED I COULD DIE
50. MY THOUGHTS ARE SO SLOW AND DOWNCAST; I DON'T WANT TO THINK OR TALK
51. I JUST DON'T CARE ABOUT ANYTHING; LIFE JUST ISN'T ANY FUN
52. LIFE SEEMS TOO MUCH FOR ME ANYHOW----MY EFFORTS ARE WASTED
53. I'M SO TIRED
54. I DON'T CONCENTRATE OR MOVE. I JUST WANT TO FORGET ABOUT EVERYTHING
55. I HAVE TOO MANY BAD THINGS IN MY LIFE
56. EVERYTHING SEEMS UTTERLY FUTILE AND EMPTY
57. I FEEL DIZZY AND FAINT. I NEED TO PUT MY HEAD DOWN AND NOT MOVE
58. I DON'T WANT TO DO ANYTHING
59. ALL OF THE UNHAPPINESS OF MY PAST LIFE IS TAKING POSSESSION OF ME
60. I WANT TO GO TO SLEEP AND NEVER WAKE UP

MOOD-STATEMENTS FOR ELATION TREATMENT SUBJECTS

1. TODAY IS NEITHER BETTER NOR WORSE THAN ANY OTHER DAY
2. I DO FEEL PRETTY GOOD TODAY, THOUGH
3. I FEEL LIGHT-HEARTED
4. THIS MIGHT TURN OUT TO HAVE BEEN ONE OF MY GOOD DAYS
5. IF YOUR ATTITUDE IS GOOD, THEN THINGS ARE GOOD; AND MY ATTITUDE IS GOOD
6. I'VE CERTAINLY GOT ENERGY AND SELF-CONFIDENCE TO SPARE
7. I FEEL CHEERFUL AND LIVELY
8. ON THE WHOLE, I HAVE VERY LITTLE DIFFICULTY IN THINKING
9. MY PARENTS ARE PRETTY PROUD OF ME MOST OF THE TIME
10. I'M GLAD I'M IN COLLEGE----IT'S THE KEY TO SUCCESS NOWADAYS
11. FOR THE REST OF THE DAY, I BET THINGS WILL GO REALLY WELL
12. I'M PLEASED THAT MOST PEOPLE ARE SO FRIENDLY TO ME
13. MY JUDGMENT ABOUT MOST THINGS IS SOUND
14. IT'S ENCOURAGING THAT AS I GET FARTHER INTO MY MAJOR, IT'S GOING TO TAKE LESS STUDY TO GET GOOD GRADES
15. I'M FULL OF ENERGY AND AMBITION----I FEEL I COULD GO A LONG TIME WITHOUT SLEEP
16. THIS IS ONE OF THOSE DAYS WHEN I CAN GRIND OUT SCHOOLWORK WITH PRACTICALLY NO EFFORT AT ALL
17. MY JUDGMENT IS KEEN AND PRECISE TODAY
18. WHEN I WANT TO, I CAN MAKE FRIENDS EXTREMELY WELL
19. IF I SET MY MIND TO IT, I CAN MAKE THINGS TURN OUT FINE
20. I FEEL ENTHUSIASTIC AND CONFIDENT NOW
21. THERE SHOULD BE OPPORTUNITY FOR A LOT OF GOOD TIMES COMING ALONG
22. MY FAVORITE SONG KEEPS GOING THROUGH MY HEAD
23. SOME OF MY FRIENDS ARE SO LIVELY AND OPTIMISTIC
24. I FEEL TALKATIVE----I FEEL LIKE TALKING TO ALMOST ANYBODY
25. I'M FULL OF ENERGY, AND I AM REALLY GETTING TO LIKE THE THINGS I'M DOING ON CAMPUS
26. I'M ABLE TO DO THINGS ACCURATELY AND EFFICIENTLY
27. I KNOW GOOD AND WELL THAT I CAN ACHIEVE THE GOALS I SET
28. NOW THAT IT OCCURS TO ME, MOST OF THE THINGS THAT HAVE DEPRESSED ME WOULDN'T HAVE IF I'D JUST HAD THE RIGHT ATTITUDE
29. I HAVE A SENSE OF POWER AND VIGOR
30. I FEEL SO VIVACIOUS AND EFFICIENT TODAY----SITTING ON TOP OF THE WORLD
31. IT WOULD REALLY TAKE SOMETHING TO STOP ME NOW!
32. IN THE LONG RUN, IT'S OBVIOUS THAT THINGS HAVE GOTTEN BETTER AND BETTER DURING MY LIFE
33. I KNOW THAT IN THE FUTURE I WON'T OVER-EMPHASIZE SO-CALLED "PROBLEMS"

34. I'M OPTIMISTIC THAT I CAN GET ALONG VERY WELL WITH MOST OF THE PEOPLE I MEET
35. I'M TOO ABSORBED IN THINGS TO HAVE TIME FOR WORRY
36. I'M FEELING AMAZINGLY GOOD TODAY!
37. I AM PARTICULARLY INVENTIVE AND RESOURCEFUL IN THIS MOOD
38. I FEEL SUPERB! I THINK I CAN WORK TO THE BEST OF MY ABILITY
39. THINGS LOOK GOOD
40. I FEEL THAT MANY OF MY FRIENDSHIPS WILL STICK WITH ME IN THE FUTURE
41. I CAN FIND THE GOOD IN ALMOST ANYTHING
42. I FEEL SO GAY AND PLAYFUL TODAY; I FEEL LIKE SURPRISING SOMEONE BY TELLING SOMEONE A SILLY JOKE
43. I FEEL AN EXHILARATING ANIMATION IN ALL I DO
44. I FEEL HIGHLY PERCEPTIVE AND REFRESHED
45. MY MEMORY IS IN RARE FORM TODAY
46. IN A BUOYANT MOOD LIKE THIS ONE, I CAN WORK FAST AND DO IT RIGHT THE FIRST TIME
47. I CAN CONCENTRATE HARD ON ANYTHING I DO
48. MY THINKING IS CLEAR AND RAPID
49. LIFE IS SO MUCH FUN; IT SEEMS TO OFFER SO MANY SOURCES OF FULFILLMENT
50. THINGS WILL BE BETTER AND BETTER TODAY
51. I CAN MAKE DECISIONS RAPIDLY AND CORRECTLY; AND I CAN DEFEND THEM AGAINST CRITICISM EASILY
52. I FEEL INDUSTRIOUS AS HECK----I WANT SOMETHING TO DO!
53. LIFE IF FIRMLY IN MY CONTROL
54. I WISH SOMEBODY WOULD PLAY SOME GOOD LOUD MUSIC!
55. THIS IS GREAT----I REALLY DO FEEL GOOD. I *AM* ELATED ABOUT THINGS
56. I'M REALLY FEELING SHARP NOW
57. THIS IS JUST ONE OF THOSE DAYS WHEN I'M READY TO GO!
58. I FEEL LIKE BURSTING WITH LAUGHTER----I WISH SOMEBODY WOULD TELL A JOKE AND GIVE ME AN EXCUSE!
59. I'M FULL OF ENERGY
60. GOD, I FEEL GREAT!

In the first part of this experiment, I will be shown a series of cards with statements typed on them. As I see each statement, I will simply read it to myself, and then I will read it once again in a manner appropriate to its intended seriousness. I will concentrate my full attention on each statement. I will exclude other ideas which are unrelated to its meaning.

I will try to avoid any urge to laugh or behave in any manner inappropriate to the seriousness of the statements by concentrating on the meaning of each statement. _If for any reason I feel I cannot continue, I will so indicate._

The next card will begin the series of statements. I will read each statement to myself, and then I will read it once again in a manner appropriate to its intended seriousness. When the experimenter signals I will move on to the next statement.

STATEMENTS FOR NEUTRAL TREATMENT SUBJECTS

1. OKLAHOMA CITY IS THE LARGEST CITY IN THE WORLD IN AREA, WITH 631,166 SQUARE MILES
2. JAPAN WAS ELECTED TO THE UNITED NATIONS ALMOST FOURTEEN YEARS AFTER PEARL HARBOR
3. AT THE END APPEARS A SECTION ENTITLED "BIBLIOBRAPHY NOTES"
4. WE HAVE TWO KINDS OF NOUNS DENOTING PHYSICAL THINGS: INDIVIDUAL AND MASS NOUNS
5. THIS BOOK OR ANY PART THEREOF MUST NOT BE REPRODUCED IN ANY WAY
6. AGRICULTURAL PRODUCTS COMPRISED SEVENTY PER CENT OF THE INCOME
7. SATURN IS SOMETIMES IN CONJUNCTION, BEYOND THE SUN FROM THE EARTH, AND IS NOT VISIBLE
8. SOME STREETS WERE STILL SAID TO BE LISTED UNDER THEIR OLD NAMES
9. THE SYSTEM IS SUPERVISED BY ITS BOARD OF REGENTS
10. THERE IS A LARGE ROSE-GROWING CENTER NEAR TYLER, TEXAS
11. MANY STATES SUPPLY MILK FOR GRAMMAR SCHOOL CHILDREN
12. IT IS GOD'S WILL THAT THE FITTEST SURVIVE
13. THE TYPOGRAPHY, PAPER, AND BIND WERE OF THE HIGHEST QUALITY
14. THE MACHINE DOMINATED COUNTRY POSTS FOR AS LONG AS ANYONE COULD REMEMBER
15. THE DESK WAS OLD, AND SCRATCHED INTO ITS SURFACE WAS A PROFUSION OF DATES, INITIALS, AND MESSAGES
16. THE ORIENT EXPRESS TRAVELS BETWEEN PARIS AND ISTANBUL
17. WHEN THE BANYAN BENT DOWN UNDER ITS OWN WEIGHT, ITS BRANCHES BEGAN TO TAKE ROOT
18. THERE ISN'T A SCIENTIFIC EXPLANATION FOR EVERY UFO
19. THE HOPE DIAMOND WAS SHIPPED FROM SOUTH AMERICAN TO LONDON THROUGH THE REGULAR MAIL SERVICE
20. THE REVIEW WAS CONCERNED WITH THE FIRST THREE VOLUMES
21. THE SHIP WAS ANCIENT AND WOULD SOON BE RETIRED FROM THE FLEET
22. SLANG IS A CONSTANTLY CHANGING PART OF THE LANGUAGE
23. THERE IS A SMALL ARTICLE IN THE LOCAL NEWSPAPER WHICH INDICATED ACCEPTANCE OF THE KIDNAPPERS' TERMS
24. THERE ARE SOME FORMS IN WHICH NO OATH IS REQUIRED
25. INTRAMATICS FINDS MATES FOR THE LONELY
26. 99.1% OF ALASKA IS OWNED BY THE FEDERAL GOVERNMENT
27. TWO MEN DRESSED AS REPAIRMEN WILL APPEAR SHORTLY AFTER THE VAN PULLS UP
28. THE WOOD WAS DISCOLORED AS IF IT HAD BEEN HELD IN A FIRE

29. A LIGHT WAS NOTICED IN THE DARK OUTSIDE, AND IT MOVED EERILY TOWARDS THE HOUSE
30. PAINTING IN A FEW OTHER NON-EUROPEAN COUNTRIES IS TREATED IN A SEPARATE VOLUME
31. THE CLOCK ON THE WALL WAS TEN MINUTES SLOW
32. PROVOKED AROUSAL AND ORIENTATION ARE ACCOMPANIED BY STEEPER NEGATIVE SHIFTS
33. THE NAMES ON THE CHRISTMAS MAILING LIST ARE ALPHABETICALLY ORDERED
34. SIGNIFICANTLY, THESE CHANGES OCCUR DURING THE FULL MOON
35. WEST SAMOA GAINED ITS INDEPENDENCE IN 1965
36. THE MAGAZINE'S REPORT WAS SLANTED, AS USUAL
37. THE MAP WOULD PROVE USELESS AS A BEGINNING GUIDE
38. THE SPEAKER OUTLINED A PLAN WHEREBY THE CURRENT DEFICITS COULD BE ELIMINATED
39. BLACK AND WHITE PICTURES ARE ARRANGED IN TEN SECTIONS
40. THE LEGISLATURE POSTPONED DISCUSSION OF THE BILL UNTIL A LATER SESSION
41. THE PAPERS HAD BEEN FRONT-PAGING IT FOR DAYS
42. THE NOTICE MADE IT CLEAR THAT COFFEE BREAKS WERE BEING LIMITED
43. NO MAN WORKED HARDER THAN HE
44. POTTER WROTE NUMEROUS SATIRES ON SOCIAL CYNICISM
45. BOEING'S MAIN PLANT IN SEATTLE EMPLOYES 35,000 PEOPLE
46. THE DOORKEEPER WAS DRESSED IN RED
47. DURING THE NEXT TEN YEARS, THE GROUP PARTICIPATED IN POLITICS
48. THE ORGANIZATION DEPENDED ON THE PEOPLE FOR SUPPORT
49. IN 1965, ELIZABETH MADE THE FIRST STATE VISIT BY A BRITISH MONARCH TO GERMANY IN 56 YEARS
50. IT WAS THEIR SIXTH CONSECUTIVE BEST SELLER
51. IT ALL FITTED IN WITH THE OFFICER'S STORY
52. THE MERGER DID NOT CHANGE THE COMPANY'S POLICY
53. THE MANSION WAS RENTED BY THE DELEGATION
54. NINETY OCCUPATIONS WERE LISTED AS ELIGIBLE FOR THE GRADS IN BUSINESS
55. UTAH IS THE BEEHIVE STATE
56. CHANGES WERE MADE IN TRANSPORT OF LUMBER AFTER THE BORDER INCIDENT
57. THE CHINESE LANGUAGE HAS MANY DIALECTS, INCLUDING CANTONESE, MANDARIN, AND WU
58. THINGS WERE BOOMING ONCE AGAIN IN THE LITTLE GOLD RUSH TOWN OF ANGEL
59. A FREE SAMPLE WILL BE GIVEN TO EACH PERSON WHO ENTERS THE STORE
60. AT LOW TIDE THE HULK OF THE OLD SHIP COULD BE SEEN

APPENDIX B

CONTROL GROUP INSTRUCTIONS

This experiment is an attempt to study how well individuals can mimic certain emotional states without actually feeling those emotions. Each day you will be asked to pretend to be in a certain mood. Today you are to act as if you are elated without actually feeling elated. Your success depends on whether an observer could not tell that you have been asked to mimic someone who feels elated rather than having been asked to feel elated yourself. For the entire experimental session you are to pretend to be elated.

An elated person feels energetic, industrious and ready to go. His mind is clear and he can make decisions rapidly. Now remember you are to act as an elated person would act without feeling elated for the remainder of the session. Wait for the signal from the experimenter before moving on to the next instruction.

This experiment is an attempt to study how well individuals can mimic certain emotional states without actually feeling those emotions. Each day you will be asked to pretend to be in a certain mood. Today you are to act as if you are depressed without actually feeling depressed. Your success depends on whether an observer could not tell that you have been asked to mimic someone who feels depressed rather than having been asked to feel depressed yourself. For the entire experimental session you are to pretend to be depressed.

A depressed person feels low, sluggish, discouraged and unhappy. He is unable to concentrate and finds it hard to make decisions. Now remember you are to act as a depressed person would act without feeling depressed for the remainder of the session. Wait for the signal from the experimenter before moving on to the next instruction.

APPENDIX C

DEPRESSION ADJECTIVE CHECK LIST

MOOD SCALE

Name ______________________________

Day 1 2 3 (circle one)

Below you will find words which describe different kinds of moods and feelings. Check the words which describe How You Feel Now. Some of the words may sound alike, but we want you to check all the words that describe your feelings. Work rapidly and check all of the words which describe how you feel now.

1) _______ unhappy
2) _______ active
3) _______ blue
4) _______ downcast
5) _______ dispirited
6) _______ composed
7) _______ distressed
8) _______ cheerless
9) _______ lonely
10) _______ free
11) _______ lost
12) _______ broken
13) _______ good
14) _______ burdened
15) _______ forlorn
16) _______ vigorous
17) _______ peaceful
18) _______ well
19) _______ apathetic
20) _______ chained
21) _______ strong
22) _______ dejected
23) _______ awful
24) _______ glum
25) _______ great
26) _______ finished
27) _______ hopeless
28) _______ lucky
29) _______ tortured
30) _______ listless
31) _______ safe
32) _______ wilted
33) _______ criticized
34) _______ fit

APPENDIX D

WORD LISTS AND VALUES

List 1

Hi 1st

Word	Pleasantness	Concreteness	Frequency of 1st associate
Dark	4.40	4.93	829
Black	3.49	4.66	751
Long	4.13	3.77	758
Butter	4.49	6.24	637
Hammer	3.88	5.94	537
Lamp	4.34	6.18	633
Chair	4.24	6.12	493
Salt	4.37	5.69	430
Needle	3.41	6.04	464
Square	3.79	5.15	372
Average	4.06	5.47	590

Lo 1st

Word	Pleasantness	Concreteness	Frequency of 1st associate
Citizen	4.31	4.51	114
Foot	3.91	5.54	232
Cabbage	3.88	6.07	165
Stomach	3.39	6.13	211
Yellow	4.62	5.33	156
Head	4.19	6.16	129
Whiskey	4.44	6.00	284
Religion	4.38	3.71	285
Deep	4.49	3.96	318
Cold	3.63	4.73	348
Average	4.12	5.21	224

List 2

Hi 1st

Word	Pleasantness	Concreteness	Frequency of 1st associate
Table	3.97	6.09	840
Hard	3.73	4.21	674
King	4.46	5.62	751
Scissors	3.54	5.92	671
Heavy	3.50	4.09	583
Tobacco	3.27	6.16	515
Rough	3.41	4.48	439
Stem	3.72	5.52	402
Carpet	4.44	5.77	460
Short	3.28	3.47	397
Average	3.73	5.13	573

Lo 1st

Word	Pleasantness	Concreteness	Frequency of 1st associate
Whistle	4.72	5.75	131
Hand	4.69	6.00	255
Working	4.42	3.79	132
Sheep	3.83	6.18	201
Stove	4.31	5.75	235
Bible	4.43	5.81	236
Street	4.05	5.84	190
Doctor	4.09	5.75	238
Priest	4.06	5.54	328
Quiet	4.71	3.85	348
Average	4.33	5.43	229

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BIOGRAPHY

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